

## **REMARKS**

The last Office Action of October 17, 2007 has been carefully considered. Reconsideration of the instant application in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 6-9 are pending in the application. Claims 6-9 have been amended. Claims 10-17 have been added. Support for the newly added claims can be found in paragraph [0017] of the originally filed specification. A total of 12 claims is now on file. No amendment to the specification has been made. No fee is due.

It is noted that the drawings are objected to because of applicant's failure to show every feature set forth in the claims.

It is further noted that claims 6-8 are objected to because of some informalities.

Claims 6-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Nakano et al. (US 2002/0003383; hereinafter Nakano) in view of Huth (US 6,664,690) and further in view of Sibata (US 5,220,228). It is assumed that claim 9 stands rejected for the same reasons as claims 6-8 and has been omitted in error. Applicant's assumption is based on the reference by the Examiner to claim 9 on page 4, last paragraph, of the Office Action. Affirmation by the Examiner is respectfully requested.

### **OBJECTION TO THE DRAWINGS**

The objection to the drawings has been addressed by amending claims 6-9 to recite that the pole coverage refers only to the rotor, which is shown in Fig. 2. Withdrawal of the objection is therefore respectfully requested.

### **OBJECTION TO THE CLAIMS**

Claims 6-9, as now on file, recite that the pole coverage refers only to the rotor. Withdrawal of the objection is therefore respectfully requested.

### **CLAIM REJECTIONS – 35 U.S.C. §103**

As realized by the Applicant and admitted in the Office Action, Nakano does not disclose a rotor pole coverage of less than 100%. Moreover, Nakano addresses the problem of reducing the torque ripple, for which, as stated in paragraph [0006] of the Nakano published application, the fifth and seventh harmonics of the induced voltage must be reduced. However, Nakano also states that the induced voltage usually contains more amount of the fifth harmonic than that of the seventh harmonic, so that it is effective for reducing the torque ripple to provide the skew at an angle where the fifth harmonic can be fully eliminated. (Paragraph [0007] of Nakano). Stated differently, Nakano appears to be satisfied of eliminating only the fifth harmonic and does not at all address contributions from the seventh harmonic.

It is, however, the stated objective of the present invention to eliminate both the fifth and the seventh harmonic, which would then also (and better) eliminate the cogging torque. Therefore, the present invention is an improvement over Nakano based on features not disclosed by Nakano and now clearly recited in amended claims 6–9.

According to the present invention, this is achieved by specifying in combination a skew angle and a reduced pole coverage of about 80% ( $\pm 10\%$ ).

The Examiner asserts that Huth discloses a rotor pole coverage in a range of 75% – 80 of the pole pitch for the purpose of reducing cost. There is no other stated or implied motive in Huth for reducing the rotor pole coverage. There is also no motive given by Nakano for further improving the motor performance by also eliminating the seventh harmonic. There is no indication in Nakano that reducing the rotor pole coverage would be operative with the disclosed stator-rotor parameters.

Sibata, like Nakano, discloses a skew angle, but fails to disclose a rotor pole coverage of less than 100%.

Furthermore, the Examiner fails to point out and Applicants fail to find a suggestion or motivation in either *Nakano* or *Huth and Sibata* to combine the

references. *Nakano and Sibata* do not suggest any unresolved challenges with regard to reducing the cogging torque by further reducing specific harmonics (such as the seventh harmonic), and *Huth* does not suggest applying the reduced rotor pole coverage to anything technical, except reducing costs. Although, the statement on page 4 of the Office Action asserting that, "It would have been obvious ... to modify *Nakano et al.* by forming a rotor with rotor pole coverage of 80% or 85% of the pole pitch and the skew angle of the rotor pole of half a slot pitch as taught by *Huth* and *Sibata* for the purpose of reducing cogging torque and reducing cost" may or may not have been the motivation driving the inventors in the instant case, the only potential teaching for any such motivation is Applicants' own patent application. Using Applicants' own invention to supply the motivation for combining references is inappropriate. As stated in MPEP §2143.01, "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." *In re Mills*, 916 F.2d 680, 16 USPQ 1430 (Fed. Cir. 1990). As that section further states, "Although a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.' " *In re Mills*, 916 F.2d at 682. See also *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992).

Since neither *Nakano* nor *Huth* or *Sibata*, taken alone or in combination, teach or suggest a combination of a specified skew of 3/5 or 3/7 of a slot pitch with respect to the synchronous motor with a pole coverage of about 80%, as recited in claims 6–9, and since there is no objective suggestion or motivation in either of *Nakano*, *Huth* or *Sibata* to combine those references, Applicant respectfully requests that the Examiner reconsiders his rejection and pass those claims to allowance.

Additionally, since newly added claims 10-17 depend from claim 6-9 and recite further limitations thereon, Applicant also requests that the Examiner pass those claims to allowance.

If the Examiner maintains the rejection of claims 6–17, Applicants request

that the Examiner point out with specificity the motivation disclosed in the cited references that supports the asserted combination.

Applicant further submits that although the stated ranges may be optimum working ranges, the *Nakano*, *Huth* and *Sibata* references fail to disclose even the fundamental concept and feasibility of combining the features recited in claims 6-9, as discussed above.

Withdrawal of the rejection under 35 U.S.C. §103(a) and allowance of claims 6-17 are thus respectfully requested.

### CONCLUSION

In view of the above presented remarks and amendments, it is respectfully submitted that all claims on file should be considered patentably differentiated over the art and should be allowed.

Reconsideration and allowance of the present application are respectfully requested.

Should the Examiner consider necessary or desirable any formal changes anywhere in the specification, claims and/or drawing, then it is respectfully requested that such changes be made by Examiner's Amendment, if the Examiner feels this would facilitate passage of the case to issuance. If the Examiner feels that it might be helpful in advancing this case by calling the undersigned, applicant would greatly appreciate such a telephone interview.

Respectfully submitted,

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